

Six new species of Geometridae (Lepidoptera) from Taiwan

Hiroshi INOUE

311-2, Bushi, Iruma City, Saitama, 358-0053 Japan

Abstract Four new species, *Monocerotesa flavescens*, *M. unifasciata*, *Rikiosatoa transversa* and *Psilalcis rotundata*, belonging to the Ennominae, and two new species, *Perizoma sugii* and *P. omnifasciaria*, to the Larentiinae are described from Taiwan, with illustrations of moths and genitalia.

Key words *Monocerotesa*, *Rikiosatoa*, *Psilalcis*, *Perizoma*, Ennominae, Larentiinae, Taiwan.

Four species of the genus *Monocerotesa* Wehrli, 1927, have been known from Taiwan (Inoue, 1992 : 113), but among them *conjuncta* (Wileman), based on a female, seems to be a close relative of *Prochasma dentilinea* (Warren) (Holloway, 1993 : 269, pl. 17 : 36 ; figs 574, 578). Hereunder two new species will be added. Two species of *Rikiosatoa* Inoue, 1982 : *fucataria* (Wileman) and *mavi* (Prout), and three species of *Psilalcis* Warren, *pulveraria* (Wileman), *breta rantaizana* (Wileman) and *menoides* (Wehrli) have been known from Taiwan (Chang, 1990 : 421, 422, 425, figs ; Inoue, 1992 : 115 ; Sato, 1993a : 13 ; *id.*, 1993b : 393 ; Holloway, 1993 : 234, 235), but one species of each genus will be described. Although two new species of *Perizoma* Hübner will be added to the Taiwan list, species of the genus from there, currently nine species (Inoue, 1992 : 128 ; Wang, 1997 : 349–357, figs), should be critically studied in future by comparing them with the Himalayan and west Chinese representatives.

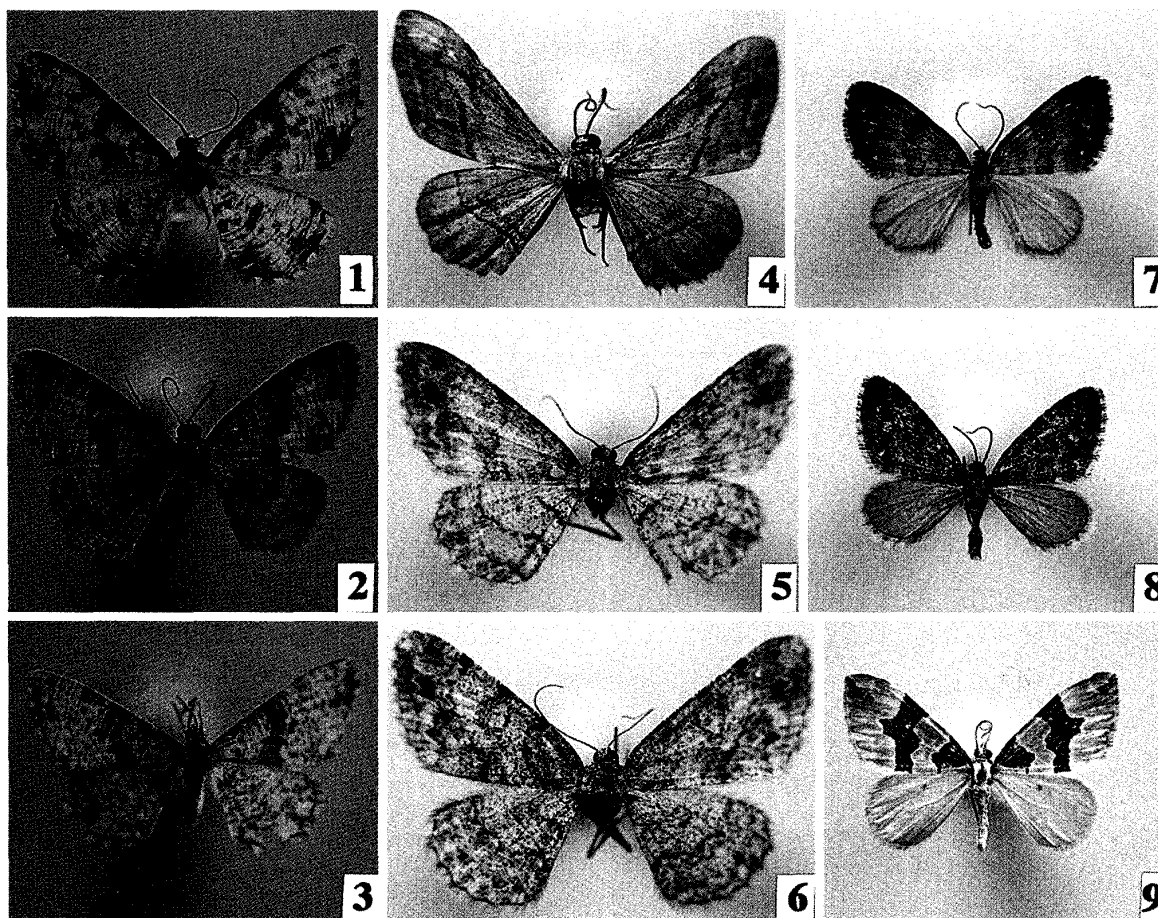
Unless stated otherwise, all the type specimens designated in this paper are in my collection, but they will be transferred to the Natural History Museum, London, as permanent depository after publication.

Subfamily Ennominae

Monocerotesa flavescens sp. nov. (Fig. 1)

Male. Similar to *M. strigata strigata* (Warren) from NE India and Nepal (Yazaki, 1992 : 27, pl. 8 : 1), but black maculation of both wings heavier. On forewing, costal spot at postmedian fascia not isolated but continuing downward to hindmargin. On hindwing subbasal, antemedian and postmedian fasciae developed at least in the posterior half, while in *strigata* such fasciae are absent and only an interrupted subterminal fascia is developed. Greyish strigulation of both wings longer but sparser than in *strigata*. Discal spot of hindwing heavy in this species, but represented by a minute dot in *strigata*. Length of forewing : 12–13 mm.

Male genitalia (Fig. 10). Uncus broad and short, parallel sided, trilobate at apex. Valva simply triangular, costa straight, lobed at apex, spined plate at the ventral area of apical portion, another setose area continued baseward, quite distinct from *strigata* (Holloway, 1993, fig. 582, *M. s. commissa* Prout). Ventral margin of valva a little hollowed at the end of sacculus. Aedeagus broad, strongly serrated at apical area.



Figs 1-9. New geometrids from Taiwan. 1. *Monocerotesa flavescens* sp. nov. Holotype, ♂. 2. *M. virgata* (Wileman), ♂. 3. *M. unifasciata* sp. nov. Holotype, ♂. 4. *Rikiosatoa transversa* sp. nov. Holotype, ♂. 5. *Psilalcis rotundata* sp. nov. Holotype, ♂. 6. *Ditto*. Paratype, ♀. 7. *Perizoma sugii* sp. nov. Holotype, ♂. 8. *Ditto*. Paratype, ♂ (Nanhutashan, 3,742 m). 9. *P. omnifasciaria* sp. nov. Holotype, ♂.

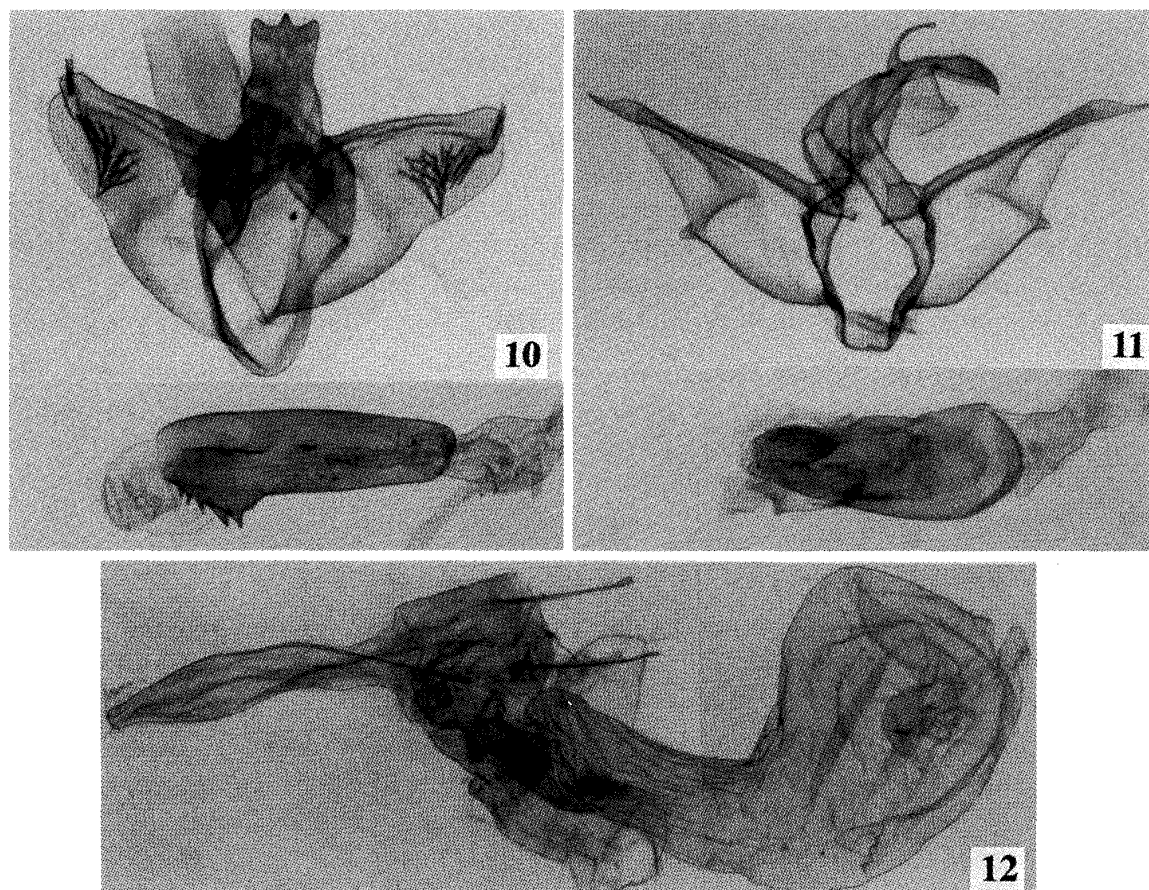
Holotype. ♂, Lushan spa, 1,200 m, Nantou Hsien, 7-8. vi. 1988 (M. Ihara). Paratypes. Ssuling, Taoyuan Hsien, 16. iv. 1983, 1 ♂; Meifeng, Nantou Hsien, 22. v. 1984, 1 ♂ (B. S. Chang).

Among the Taiwanese congeners *M. virgata* (Wileman) (Fig. 2) is most similar, but it is readily distinguished from the present new species by the hindwing, whose discocellular spot is absent or very small and transverse fasciae are absent.

Three species of *Monocerotesa* were illustrated by Chang, 1990, but his identifications are incorrect: *M. abraxides* (Prout) (p. 242) is *virgata* (Wileman), *M. [sp.]* (p. 244) is the present species and *M. coalescens* (Bastelberger) (p. 245) is *abraxides* (Prout).

Monocerotesa unifasciata sp. nov. (Fig. 3)

Smaller than the preceding species. Similar to *M. virgata* (Wileman) in size and maculation, but blackish brown strigulation of the both wings less heavy. Forewing with median fascia much clearer, much narrower at costal area, postmedian dotted line clearer, subterminal area with cloud-like marks at costal and tornal areas. Hindwing with basal half concolorous



Figs 10–12. Genitalia of *Monocerotesa* spp. 10. *M. flavescens* sp. nov., ♂ (HI Slide 13869).
11. *M. unifasciata* sp. nov., ♂ (HI Slide 12082). 12. *Ditto*, ♀ (HI Slide 12083).

with distal half, while in *strigata* the basal half is dark greyish. Length of forewing: ♂ ♀ 11 mm.

Male genitalia (Fig. 11). Uncus beak-shaped, emitting dorsally a curved stick-like process from base. Valva with a straight costa, apical area swollen, terminating in a sharp point. Sacculus gently curved, a small rounded process at its tip, a band-like sclerite from base of the process extending to costa strongly bent towards the costal projection. Small and broad aedeagus with strongly sclerotized apical area. Female genitalia (Fig. 12). Lamella antevaginalis complicatedly sclerotized. Ductus bursae broad, striated, about as long as diameter of globular corpus bursae. Signum absent.

Holotype. ♂, Lushan spa, 1,200 m, Nantou Hsien, 29. iv.–1. v. 1973 (K. Nakatomi). Paratypes. Type locality, 26–29. vi. 1973, 1 ♂ (M. Owada); *ditto*, 7–9. xi. 1983, 1 ♂ (K. Yazaki); *ditto*, 26–28. vii. 1984, 1 ♂ (R. Sato); Wushe, Nantou Hsien, 29. x. 1972, 1 ♀ (S. Yamane).

Although this species is similar to *virgata*, the male genitalia are quite distinct: in *virgata* the uncus has no dorsal process and the valva is much more complicated.

***Rikiosatoa transversa* sp. nov.** (Fig. 4)

Male. Antenna bipectinate, the longest branches a little over the width of shaft. Frons

smooth, fuscous brown, central area banded with white, dorsal margin, scape of antenna and vertex white. Thorax and abdomen above brown, strongly mixed with white scales. Wings, upper surface pale brown, traversed with blackish fasciae. Forewing with oblique ante- and postmedian lines parallel, the latter thicker, weakly angled at vein 6, median shade-like fascia running on discocellulars, closely approximated with the postmedian line, subterminal dark brown fascia edged distally with whitish line. Hindwing with median and postmedian lines approximated as on forewing, the former not reaching costal area. Under surface brownish, densely dotted with fuscous scales, median and postmedian fasciae of the upper surface weakly reproduced, minute fuscous bars on discocellulars. Length of forewing : 15 mm.

Male genitalia (Fig. 13). Uncus triangular, apex blunt, gnathos about as long as uncus, apex rounded. Valva elongate, costa swollen at apex, ventral margin smoothly rounded, spinulose at apical area, inner surface simple, without harpe and ampulla. A pair of long arms arising from juxta, their inner margin serrated, apices sharp, reaching the base of the uncus. Aedeagus straight, about as long as valva, cornutus absent.

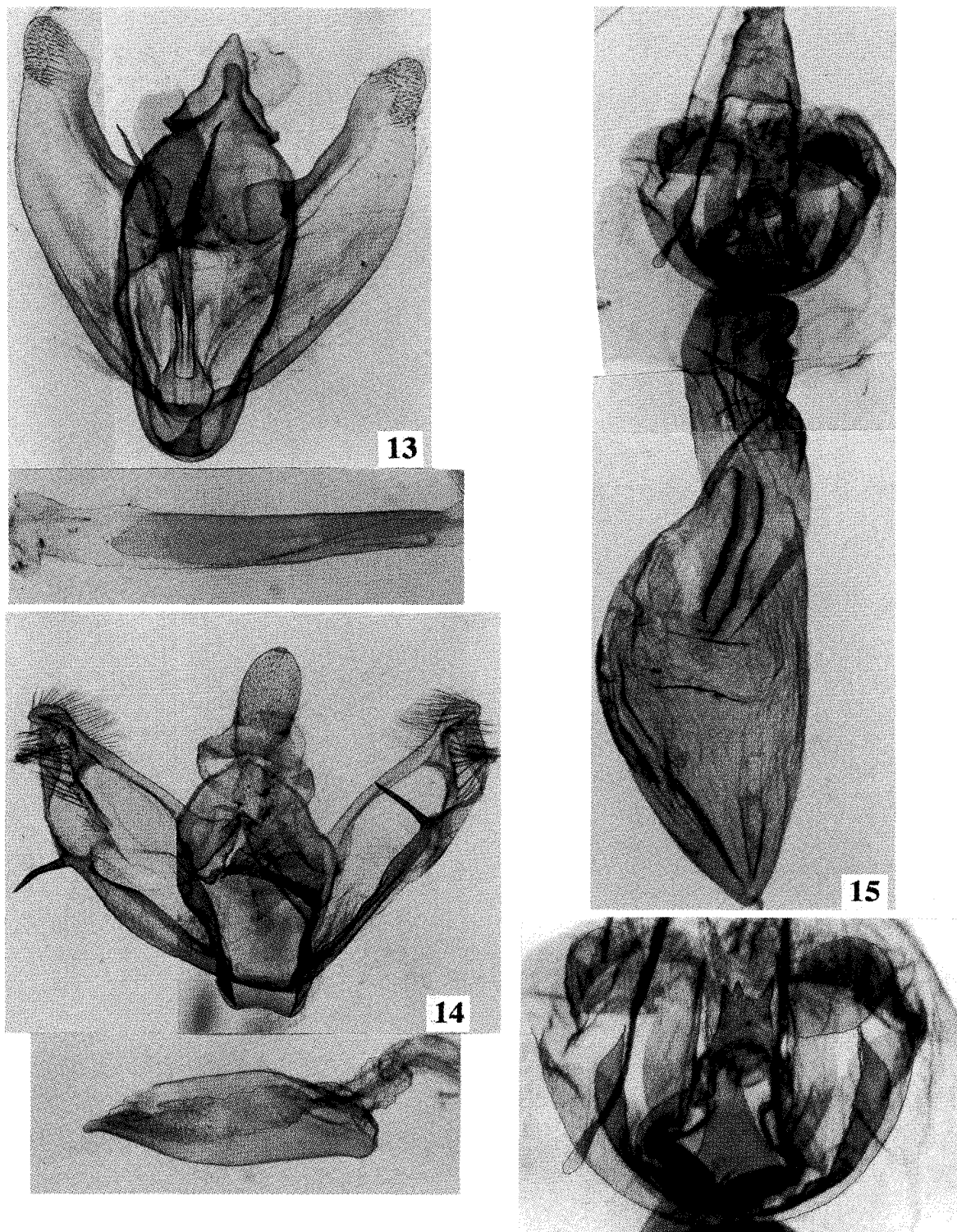
Holotype. ♂, Ssuling, Taoyuan Hsien, 22. xi. 1982 (B. S. Chang).

Somewhat similar to *R. mavi* (Prout) (Chang, 1990 : 334, figs), but the antennal branches much shorter, wings narrower and quite distinct in the male genitalia (Inoue, 1978 : 240, fig. 94, as *shibatai* Inoue). Sato, 1992, described two new species of this genus from Thailand and redescribed two Chinese species with good illustrations, but none of them match the present new species in the maculation of wings and in the genitalia.

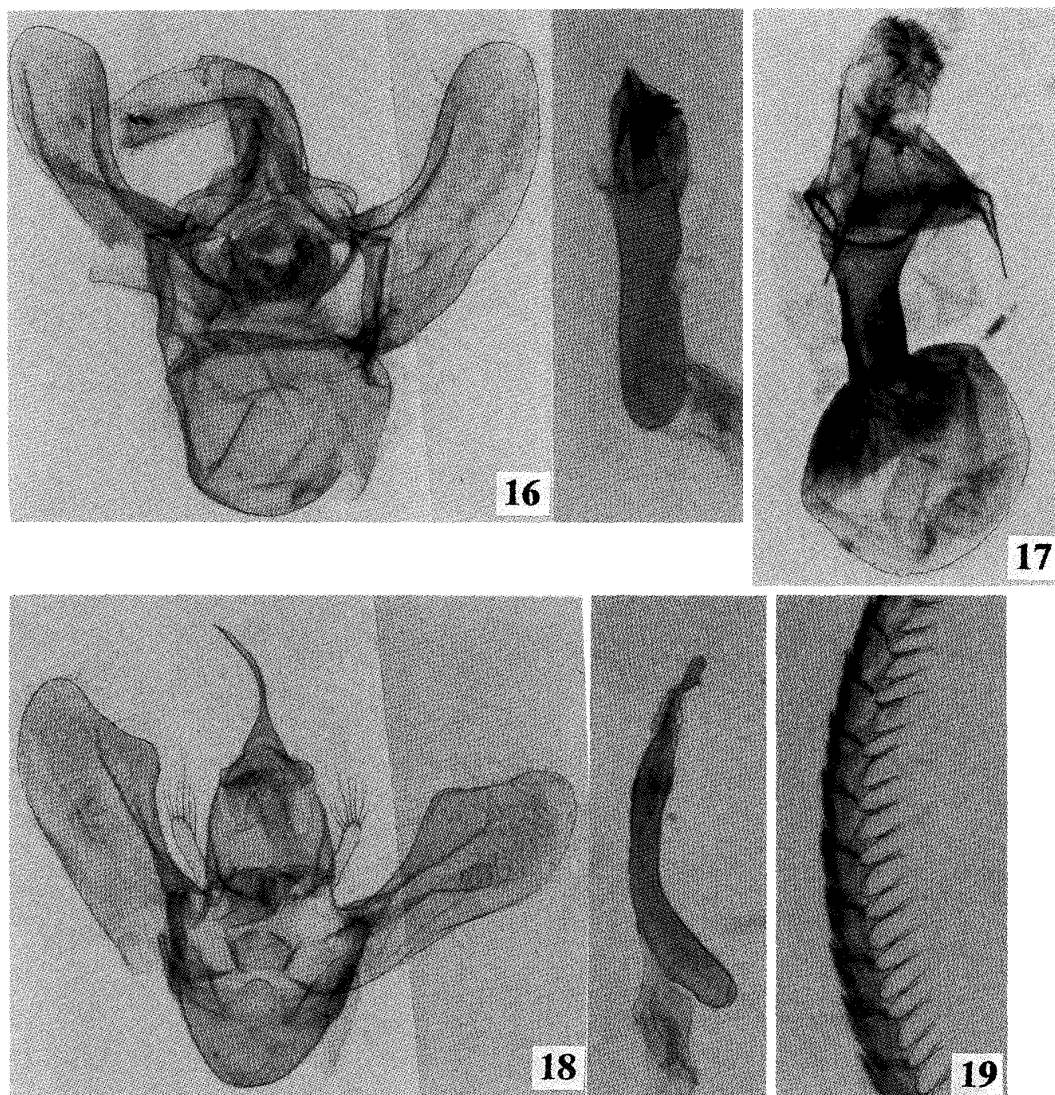
***Psilalcis rotundata* sp. nov.** (Figs 5, 6)

Antenna in male ciliated, in female simple. Face and 3rd joint of palpus with dorsal surface white, mixed with blackish scales, 2nd and 3rd joints of palpus blackish. Wings, upper surface white, scattered with fuscous and dark brown scales. Forewing with antemedian fascia blackish, nearly straight or gently curved, median fascia weaker, strongly produced at discocellulars, discal mark small but conspicuous, postmedian line serrated, the distance of the three lines nearly equal at costa, but postmedian and median approximated at posterior half. The outer edge of postmedian line light brownish, inside of white subterminal line spotted at costal area and between veins 4 and 6. Terminal area fuscous, fringe white, spotted with dark brown at extension of spaces between veins. Hindwing whiter than forewing, median fascia not reaching costal margin, postmedian line finely serrated, parallel with termen. Discal mark as strong as on forewing. Termen whiter than on forewing. Under surface much lighter than above, hued with pale yellow. Forewing with costal and anterior terminal area fuscous. Both wings with median and postmedian lines faintly reproduced. Discal mark clearer than on upper surface. Length of forewing : ♂ 15 mm, ♀ 16 mm.

Male genitalia (Fig. 14). Uncus large, spatulate, covered with short hairy spines. Gnathos broad, but thinly sclerotized. Valva complicated, costa strongly sclerotized, swollen at apex, from apical area of costa emitting ventrally a long process whose outer margin is decorated with long spines. Sacculus fold strongly sclerotized, its apex bearing a long horn-like process. Aedeagus broad and short, apex narrowly produced, cornutus absent. Female genitalia (Fig. 15). The sclerotization around the genital opening very complicated. Colliculum a sheath-like process, with a dentate caudal margin. Lamella antevaginalis with a band-like sclerotization. Ductus bursae short, continuing to elongate oval corpus bursae. Signa a pair of band-like sclerotization, placed near base of bursa.



Figs 13–15. Male and female genitalia. 13. *Rikiosatoa transversa* sp. nov., ♂ (HI Slide 16445). 14. *Psilalcis rotundata* sp. nov., ♂ (HI Slide 16443). 15. *Ditto*, ♀ (HI Slide 16444). Lower: sterigma, enlarged.



Figs 16–18. Genitalia of *Perizoma* spp. 16. *P. sugii* sp. nov., ♂ (HI Slide 16475). 17. *Ditto*, ♀ (HI Slide 16348). 18. *P. omnifasciaria* sp. nov., ♂ (HI Slide 12125).
 Fig. 19. Male antenna of *Perizoma omnifasciaria* sp. nov.

Holotype. ♂, Hueysuen, Nantou Hsien, 2. iv. 1983. Paratype. 1 ♀, Shengpaling, Taoyuan Hsien, 30. iv. 1982 (B. S. Chang).

Ostensibly similar to some species of *Myrioblephara*, for instance *M. idaeoides* (Moore) from NE India and Nepal (Sato, 1993 : 17, pl. 36 : 20), but the genitalia are quite distinct from that genus. Among the hitherto known species of the genus *P. conceptaria* Holloway, *paraceptaria* Sato and *vietnamensis* Sato have a broad uncus (Sato, 1996, figs 71–73), but theirs are narrower than in the present new species.

Subfamily Larentiinae

Perizoma sugii sp. nov. (Figs 7, 8)

Antenna in male minutely ciliated, palpus about one and half length of diameter of eye. By

its small size, maculation of forewing and ochreous colour of hindwing this species is readily distinguished from the known congeners. In light coloured specimens palpus and head are densely covered with white scales on a black ground, but those with blackish forewing palpus and head have a sparse covering of white scales. Forewing with the typical maculation of *Perizoma*; blackish brown central band margined proximally and distally with pale ochreous bands. Subterminal line represented by white dots, usually the central dot being conspicuous. Hindwing deep or pale ochreous, unmarked. Under surface pale ochre, almost unmarked or transverse lines weakly reproduced. Length of forewing: ♂♀ 8–10 mm.

Male genitalia (Fig. 16). Uncus degenerated. Aedeagus broad, straight, nearly as long as valva. Cornuti a long and short spine and a serrated curved process. Female genitalia (Fig. 17). Ductus bursae strongly sclerotized, broad, funnel-shaped at genital opening, about as long as globular corpus bursae. Signum absent.

Holotype, ♂, and paratypes, 7 exs, Houhuanshan, 3,100 m, Hualien Hsien, 10–11. vi. 1988 (S. Sugi); 2 paratypes in coll. K. Yazaki. Paratypes. Type locality, 23–24. vi. 1989, 2 exs; Shuehshan, 3,400 m, Taichung Hsien, 1 & 3. vii. 1989, 8 exs; Shiermatseng, 3,100 m, Mts Nanhutashan, Taichung Hsien, 6. viii. 1990, 3 exs; Summit of Nanhutashan, 3,742 m, 8. viii. 1990, 1 ex.; Shuehshan, 3,300–3,500 m, Taichung Hsien, 15. viii. 1990, 4 exs (M. Owada), in coll. National Science Museum, Tokyo.

According to the information given me by the collectors, this alpine species is a dayflying moth, rather exceptional for *Perizoma*. It is univoltine, appearing between June and August, and the specimens collected in June and July are usually more lightly coloured than those secured in August. One male (Fig. 8) collected at the highest point, 3,742 m, of Nanhutashan, has the most fuscous forewing.

***Perizoma omnifasciaria* sp. nov.** (Fig. 9)

Male. Palpus about twice diameter of eye, light greyish brown, face, dorsal side of thorax and abdomen white. Antenna fasciculated on short pectines (Fig. 19). Forewing with light brown ground colour, basal patch bluish black, strongly angled bellow cell, central band of the same colour complete from costa to hindmargin, its inner margin arched in cell and angled inward at ventral margin of cell, the distal margin incurved between costa and vein 5, strongly projected outward on vein 5 and more weakly so on vein 6, subterminal white line undulating. Hindwing white, lightly hued with yellowish brown, discal dot small, postmedian line faint, acutely angled at vein 4. Under surface browner, forewing with basal patch and central band faintly reproduced, hindwing with more accentuated discal mark and postmedian line. Length of forewing: 15–16 mm.

Male genitalia (Fig. 18). Uncus developed as a long thorn-like process, about half length of valva. Valva with apically lobed costa. Valvula expanded toward apex, sacculus well-marked. Labides elongate. Aedeagus strongly down-curved at middle.

Holotype. ♂, Hohuanshan, 3,100 m, Hualien Hsien, 30. vii. 1983 (A. Kawabe). Paratypes. Nengkaoshan, ca 2,800 m, Nantou Hsien, 2 ♂ (Ching-Shong Yu); type locality, 2–3. v. 1990 (A. Kawabe).

This striking species seems to be the closest relative of *P. fractifasciaria* (Leech) from west China, but readily distinguished by the complete central band of forewing.

Acknowledgement

My thanks are due to Mr M. Ihara, Nagano, Mr K. Nakatomi, Tokyo, Dr M Owada, National Science Museum, Tokyo, Dr R. Sato, Niigata, Mr S. Sugi, Tokyo, Mr K. Yazaki, Tokyo, the late B. S. Chang, Taiwan, and the late A. Kawabe, Tokyo, for their gift or loan of specimens. Dr Sato gave me a pertinent advice on the generic status of the new species of *Rikiosatoa* and *Psilalcis*.

References

- Chang, B. S., 1990. *Illustrations of Moths in Taiwan* (4). 480 pp., many coloured figures. The Taiwan Museum, Taipei. (In Chinese).
- Holloway, J. D., 1993. The moths of Borneo : family Geometridae, subfamily Ennominae. *Malay. Nat. J.* **47** : 1-309, pls 1-19, 593 figs.
- Inoue, H., 1978. New and unrecorded species of the Geometridae from Taiwan with some synonymic notes. *Bull. Fac. domest. Sci. Otsuma Wom. Univ.* **14** : 203-254.
- , 1992. Geometridae. In Heppner, J.B. & H. Inoue (Eds), Checklist. *Lepid. Taiwan* **1** (2) : 111-129.
- Sato, R., 1992. The genus *Rikiosatoa* (Lepidoptera, Geometridae) from Thailand, with taxonomic notes on two Chinese species. *Jap. J. Ent.* **60** : 559-566.
- , 1993a. Geometridae: Ennominae (part). In Haruta, T. (Ed.), Moths of Nepal, Part 2. *Tinea* **13** (Suppl. 3) : 5-30, pls 34-38.
- , 1993b. The genus *Psilalcis* Warren (Geometridae) from Taiwan. *Japan Heterocerists' J.* (172) : 393-395.
- , 1996. Six new species of the genus *Psilalcis* Warren (Geometridae, Ennominae) from Indo-Malayan region, with some taxonomic notes on the allied species. *Tinea* **15** : 55-68.
- Wang, H. Y., 1997. *Geometer Moths of Taiwan and its allied Species from the neighboring Countries* **1**. 405 pp., many colour pictures. The Taiwan Museum, Taipei. (In Chinese).
- Yazaki, K., 1992. Geometridae. In Haruta, T. (Ed.), Moths of Nepal, Part 1. *Tinea* **12** (Suppl. 2) : 5-46, pls 2-12.

摘 要

台湾産シャクガ科の6新種の記載 (井上 寛)

台湾から *Monocerotesa* 属の2新種, *Rikiosatoa* 属の1新種, *Psilalcis* 属の1新種 (以上エダシャク亜科) および *Perizoma* 属の2新種 (ナミシャク亜科) を記載した. *Perizoma* 属のうち *P. sugii* Inoue は中部高山帯の3,000 m以上の高所に生息し, この属としては例外的に昼飛性である.

(Accepted January 25, 1998)